ABSTRACT OF THE DISCLOSURE

The present invention, generally speaking, provides for high-efficiency power control of a high-efficiency (e.g., hard-limiting or switch-mode) power amplifier in such a manner as to achieve a desired control or modulation. Unlike the prior art, feedback is not required. That is, the amplifier may be controlled without continuous or frequent feedback adjustment. In one embodiment, the spread between a maximum frequency of the desired modulation and the operating frequency of a switch-mode DC-DC converter is reduced by following the switch-mode converter with an active linear regulator. The linear regulator is designed so as to control the operating voltage of the power amplifier with sufficient bandwidth to faithfully reproduce the desired amplitude modulation waveform. The linear regulator is further designed to reject variations on its input voltage even while the output voltage is changed in response to an applied control signal. This rejection will occur even though the variations on the input voltage are of commensurate or even lower frequency than that of the controlled output variation. Amplitude modulation may be achieved by directly or effectively varying the operating voltage on the power amplifier while simultaneously achieving high efficiency in the conversion of primary DC power to the amplitude modulated output signal. High efficiency is enhanced by allowing the switch-mode DC-to-DC converter to also vary its output voltage such that the voltage drop across the linear regulator is kept at a low and relatively constant level. Time-division multiple access (TDMA) bursting capability may be combined with efficient amplitude modulation, with control of these functions being combined. In addition, the variation of average output power level in accordance with commands from a communications system may also be combined within the same structure.